# Improving the Health of Mothers and Children of Rural Jinotega, Nicaragua: An Integrated Approach in Partnership with the Public and Private Sector Providers in Coffee-Growing Areas

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Cooperative Agreement No. HFP-A-00-02-00026-00

**KPC BASELINE SURVEY REPORT**

**Project Location: Department of Jinotega, Nicaragua**

## Submitted to:

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**ACRONYMS**

| | |
|---|---|
| AIN | Integrated Services to the Child |
| ARI | Acute Respiratory Infection |
| BCC | Behavior Change and Communication |
| BF | Breastfeeding |
| CAs | Cooperating Agencies |
| CDD | Control of Diarrheal Diseases |
| CHV | Community Health Volunteer |
| CHW | Community Health Worker |
| CORE | The Child Survival Collaborations and Resources Group |
| COL-VOL | Volunteer Collaborator for Malaria Control |
| CORU | Community Oral Rehydration Unit |
| CSTS | Child Survival Technical Support Project |
| CS | Child Survival |
| DHS | Demographic Health Survey |
| DIP | Detailed Implementation Plan |
| DR | Decision Rule |
| EPI Info | Immunization and Epidemiological Data System, WHO |
| EON-C | Obstetric and Neonatal Emergencies in the Community |
| FAM | Financial and Administrative Manager |
| FFHU | Fully Functional Health Unit |
| FP | Family Planning |
| GM | Growth Monitoring |
| GMP | Growth Monitoring and Promotion |
| GIK | Gift-In-Kind |
| GON | Government of Nicaragua |
| H/C | Health center |
| H/P | Health post |
| HQ | Headquarters |
| HIS | Health Information System |
| IEC | Information, Education and Communication |
| IMCI | Integrated Management of Childhood Illness |
| IMR | Infant Mortality Rate |
| IUD | Intra-Uterine Device |
| KPC | Knowledge, Practice, and Coverage |
| LAM | Lactational Amenorrhea Method |
| LQAS | Lot Quality Assurance Sampling |
| MCH | Maternal and Child Health |
| MMR | Measles, Mumps and Rubella |
| MN | Micronutrients |
| MOH | Ministry of Health |
| MTCT | Mother-to-Child Transmission |
| MSH | Management Sciences for Health |
| MWH | Maternity Waiting Homes |
| NFP | Natural Family Planning |
| NGO | Non-Governmental Organization |
| NICASALUD | Network of PVOs in Nicaragua |
| OR | Operations Research |
| ORT | Oral Rehydration Therapy |
| ORS | Oral Rehydration Salt |
| ORT | Oral Rehydration Therapy |
| PAHO | Pan American Health Organization |
| PAININ | Program for Integrated Services to Nicaraguan Children |

| | |
|---|---|
| PHC | Primary Health Care |
| PVO | Private Voluntary Organization |
| QA | Quality Assurance |
| RAAN | Northern Atlantic Autonomous Region |
| RDA | Recommended Dietary Allowance |
| RH | Reproductive Health |
| SILAIS | Sistemas Locales de Atencion Integral en Salud |
| SO/IR | Strategic Objectives/Intermediate Results |
| STI | Sexually Transmitted Infections |
| TA | Technical Assistance |
| TBA | Traditional Birth Attendant |
| TFR | Total Fertility Rate |
| TIPS | Trials of Improved Practices |
| UNAIDS | Joint United Nations Programme on HIV/AIDS |
| UNFPA | United Nations Population Fund |
| VA | Vitamin A |
| VAD | Vitamin A Deficiency |
| VCT | Voluntary Counseling and Testing |
| VHB | Village Health Bank |
| W/MCH | Woman/Maternal Child Health |

## EXECUTIVE SUMMARY

During the month of March 2003, Project HOPE with the cooperation of the Ministry of Health of Nicaragua, community agents, and the population in the target communities planned and implemented a Knowledge, Practices, and Coverage (KPC) survey among mothers with children under two years of age. The KPC survey, which sampled communities from all eight municipalities in the Department of Jinotega, served to provide key information on maternal and child health knowledge and practices. Results of the survey provided quantitative data to establish a baseline to prioritize and plan activities throughout the life of the Child Survival (CS) program, mostly in rural communities of Jinotega.

The KPC survey was carried out by the technical team of Project HOPE Jinotega and external personnel with experience in this type of surveys. Also, technical support was provided by MOST, the Universidad Nacional Autonoma de Nicaragua (UNAN), the Ministry of Health (MINSA) for the training process and monitoring of the anthropometrical measurement samplings, the Director of Project HOPE Nicaragua, and technical assistants of Project HOPE Headquarters personnel. For the training, testing of survey tools and initiation of survey activities on the ground we also had the active presence of HQ personnel. The Food and Nutrition Technical Assistance (FANTA) Project also provided technical support in the analysis and measurements of complementary feeding practices.

To obtain the baseline information, the Project HOPE team used the Lot Quality Assurance Sampling (LQAS), a stratified random sampling methodology. In addition, parallel sampling was used to better understand two groups: mothers with children 0-11 months of age, and mothers with children aged 12-23 months. For each of these groups, slightly different instruments were used. These instruments had already been used in prior KPC surveys with some adaptations and inclusion of questions about reproductive health, danger signs, diarrhea, feeding practices and fluids intake during infant diseases episodes, and HIV/AIDS. Measurements for weight, height, and hemoglobin levels were also taken for children under two years of age, and hemoglobin levels for mothers, using the universally accepted HEMOCUE equipment. The team composed of MOST, UNAN, MINSA Central, NICASALUD and Project HOPE provided training for weighing, height measuring, hemoglobin, sampling, and LQAS methodology. The sample size was 19 mothers with children under two years of age in each of the two groups 0 to 11 and 12 to 23 months of age, for each Supervision Area (SA=8), with a subtotal of 152 mothers by age group, and a grand total of 304 interviewed mothers selected randomly.

Data collection took place approximately within a two-week period. Ten survey teams were formed with one supervisor and one interviewer in each team. Quality control was done by six staff members from Project HOPE and stakeholders, who used a quality control checklist during the interview process. In addition, this CS program pilot-tested the use of electronic Portable Digital Assistants (PDAs) for data capturing and analysis.

The analysis was done using LQAS tabulation forms in the field. Average coverage rates (non-weighted) were calculated for CS indicators —including Rapid CATCH ones— for the entire program area. In addition, adjusted coverage rates (weighted) were calculated for each indicator based on population size. Finally, 95% Confidence Intervals (CI) were calculated for each indicator considering population size for each SA.

The KPC survey information collected provided the following results:

The age group for interviewed mothers was between 20 and 34 years of age. Out of which more than a quarter (25.36%) did not know how to read or write.

Breastfeeding practices for mothers of children from 12 to 23 months of age showed an average of 66.7% (non-weighted average) of the children receiving breast milk during the first hours after birth. The municipalities found below this average were Jinotega, El Cua, and Bocay. From the 0 to 11 age group 69.5% (non-weighted average) received breast milk during the first hours after birth. All municipalities were found to be equal or above this average. The percentage of children 0 to 5 months of age that received breast milk in the last 24 hours was 56.0% (95% CI = +/- 12.5%).

Regarding the nutritional practices of mothers, more than two thirds (67.9%) of children 0 to 23 had weight measurements recorded in their health cards in the last four months. The municipalities of Jinotega, Wiwili, and Bocay were found below the average.

Stunting in the 0 to 11 months old group was 7.9% (non-weighted average) and for the group of children 12 to 23 months of age was 30.3% (non-weighted average). This number is higher than the national average of 22.2% for the 12 to 23 months old group according to ENDESA 2001.
The results for hemoglobin determination for the project area showed that 41.9% of children under two years of age have anemia (levels below 11mg/dl.)

The results of the immunization coverage for the project area reflect that more than two thirds (68.7%) of children 12 to 23 months old received all vaccines at the moment of their first birthday. The municipality of Pantasma was found to be below this average coverage and the municipalities of Wiwili and Bocay barely reached this average.

Regarding diarrhea, the KPC survey revealed low knowledge of danger signs recognition by the mother. Surveys results found that 26.3% (non-weighted average) of mothers could recognize at least two danger signs (dehydration signs) during diarrhea episodes for children aged 0 to 11 months old. The municipalities of Jinotega and Pantasma were found to be below the average. In the 12 to 23 months old group 30.3% (non-weighted average) of mothers could recognize at least two danger signs. The municipality of El Cua is the only one below this average.

As for the demand of services, results showed a significantly low rate of utilization. The average number of children with diarrhea seen by qualified medical personnel or at the Community Oral Rehydration Unit (CORU) was 36.2% (non-weighted average) for the 0 to 11 months old group. All municipalities were found to be below the average, with the exception of Jinotega and El Cua, which are right at the limit. For the 12 to 23 months old group the result was 31.1% (non-weighted average). In this group all municipalities were found below the average, with the exception of Jinotega and La Concordia. Overall, only 35.7% of children aged 0-23 months with diarrhea sought help at a health facility or CORU (95% CI= +/- 8.8%).

Regarding the percentage of mothers that reported having given equal amount or more food to their child during the last diarrheal episodes for both groups (0 to 11 and 12 to 23 months old), the result was 45.5%. The percentage of mothers that reported having given equal amount or more liquids to their child during the last diarrheal episodes for both groups (0 to 11 and 12 to 23 months old) was 69.1%.

With respect to Acute Respiratory Infections (ARI) management, the percentage of children 0 to 23 months old with fast breathing that were seen at a health unit was 59.7%. Regarding pneumonia danger signs knowledge, 76.3% (non-weighted average) of mothers for children 0 to 11 months old can identify fast breathing as a danger sign. The municipality of Wiwili was found to be below the average coverage. For the 12 to 23 months old group the result was 72.4% (non-weighted average) and the municipalities of Wiwili and Bocay were found below the average.

Regarding maternal and newborn care, the percentage of mothers who reported that during their last pregnancy received the tetanus vaccine (dT) was 86.8% (non-weighted average) for the 0 to 11 months old group and 84.2% (non-weighted average) mothers with children 12 to 23 months of age. For both groups, the municipalities found to be below the project area average were Wiwili and Bocay.
Only 37.5% (non-weighted average) of mothers with children 0 to 11 months old reported having at least one postnatal visit. The municipality of Bocay is the only one below the project area average.
A little over half of children (51.4%) 0 to 23 months of age had their birth attended by qualified medical personnel (doctor or nurse). The municipalities of Wiwili and Bocay were found to be below the average.

With respect to birth spacing, the percentage of children 0 to 11 months old that were born at least 24 months after their previous surviving child was 86.8% (non-weighted average). The municipality of Wiwili was found to be below the average for the project area. For the 12 to 23 months old group, the average was 80.9% (non-weighted average). The municipality of Bocay was found to be below the project area average.
Regarding mothers with children 12 to 23 months of age that stated using some type of modern family planning method, the average coverage was 65.0% (non-weighted average). The municipalities of San Rafael del Norte and Bocay barely reach the project area average.

With regard to STIs and HIV/AIDS, the percentage of mothers that know at least one way to prevent was 44.0% (non-weighted average) for the 0 to 11 months group. The municipality of El Cua was found to be below the project area average, and Wiwili was rated at the limit. For the mothers with children 12 to 23 months of age the result was similar (44.0% non-weighted average). The municipalities of Pantasma and Bocay were found to be below the average.

In general, the municipalities that present the greatest limitations regarding knowledge, practices and coverage for child survival interventions are, in order of priority: Wiwili, Bocay, El Cua and Jinotega.

## I. BACKGROUND

The department of Jinotega is located in the north region of Nicaragua, with an area of 9,389 $km^2$ (8% of the total country surface). The estimate of population for the year 2003, according to the Instituto Nicaraguense de Estadisticas y Censos (INEC), is 298,754 inhabitants, with a density of 31.8 person per $km^2$, much lower than the national average of 75 people per $km^2$. Jinotega borders at the north with Honduras, to the south with the department of Matagalpa, to the east with the Region Autonoma del Atlantico Norte (RAAN) and to the west with the departments of Nueva Segovia, Madriz and Esteli.

Politically, the department is divided into eight municipalities: Jinotega, San Rafael del Norte, San Sebastian de Yali, La Concordia, Santa Maria de Pantasma, Wiwili, El Cua, and San Jose de Bocay. The department can be described as mountainous, with warm weather but with specific weather characteristics in each municipality, ranging from very humid to dry. The city of Jinotega is the capital of the department, and is located 161 kilometers from the country's capital Managua. Accessibility by road with Matagalpa and Managua is good through paved roads and with Esteli via unpaved roads usable all year. The municipalities are joined between them by unpaved roads in poor conditions, some municipalities such as Wiwili and San Jose de Bocay have communities that are accessible via the rivers in a large portion of the territories. The main rivers in the department are: the Coco River, the longest and largest in Central America, the Bocay and Amaka Rivers which feed into the Coco River and cross the municipalities of El Cua, and San Jose de Bocay.

Jinotega is characterized by being a region producing staple grains, coffee, and non-traditional products, and a limited cattle industry. The mountainous areas of Jinotega, Wiwili, El Cua, Bocay, Yali and San Rafael are perfect for the production of coffee. The municipality of Pantasma produces different crops such as staple grains, vegetables, and tobacco. Some of the areas are classified as "*tierra caliente*" (very hot climate) in which there is no production whatsoever due to lack of rain. Jinotega also generates electricity by means of the hydroelectric plant of Lake Apanas, which produces about 30% of the national electrical energy.

The social and economic situation of the department of Jinotega has been depressed in the latest years by the return of large populations to their original homes after the war, and by the fall of the international coffee prices, the main source of financial income for Jinotega.

Housing
The percentage of families that own a house is 52.3%; from these, 51.4% are made out of wood. Only 23.2% of the houses have electricity (ENDESA 2001).

Water and sanitation
In the urban area 40% of the houses have drinking water as compared to only 10% in the rural area. The percentage of houses that have latrines is 41.3% for the whole department of Jinotega (ENDESA 2001).

Communications
The percentage of population that reports having a transistor radio was 74.6% (ENDESA 2001).

Poverty

The dependency relation is 11:1. According to the poverty map of the UNDP and the Technical Secretariat of the Presidency for the year 2000, the municipalities of El Cua, Bocay and Wiwili are classified as of extreme poverty; Yali, San Rafael del Norte and Pantasma are classified as high poverty; La Concordia and Jinotega are medium poverty. The municipalities with severe poverty represent 41% of the department's population.

The Ministry of Education (MECD) estimates that the number of education centers covers only 40% of the territory. According to ENDESA 2001, a 39.9% of the population cannot read or write and 41.5% of women have never attended school. Regarding the education level of heads of family, 55% do not know how to read or write, only 10% have attended secondary school or higher studies and 35% completed primary education. Of the heads of family, 20% are single mothers.

The depressed social and economic conditions, directly impact on health indicators of the general population with a greater risk of illnesses or death. Women of reproductive age and children younger than five years old are the group at greater risk, comprising 51.2% of the total population. The latest survey carried out by the MINSA's Nutrition Office in 1994 ranked Jinotega as high risk regarding micronutrients deficiency.

The SILAIS (Sistemas Locales de Atencion Integral en Salud) Annual Operation Plan 2001-2003, indicates that during the year 2001, of the total number of children ages 1 to 5 years old that attended the Growth Monitoring and Promotion (GMP) Program at the SILAIS health units, 46% were found malnourished or at risk of malnutrition. According to ENDESA 2001, 96.6% of children were breastfed at some point, 74% started breastfeeding within the first hours after birth, and average duration for exclusive breastfeeding was 3.3 months.

Health services coverage is estimated at 80% of the population, institutional births 33.2%, SINEVI coverage (mortality 60% and birth rate 75%), according to ENDESA 2001, the global fertility rate is 5.3%[1].

**Table 1: Health indicators – SILAIS Jinotega**

| Pathology | Rate Dept./ 2000 | ENDESA /2001 Rate |
|---|---|---|
| Mortality from diarrhea | 11.8 | N/A |
| Mortality from ARIs | 13 | N/A |
| Maternal mortality | 98.6/100,000 LB | N/A |
| Infant mortality | 18 | 40 |
| Perinatal mortality | 19.8 | 21 |
| Diarrhea prevalence | N/A | 19.6 |
| ARIs prevalence | N/A | 35.4 |

The women's health indicators for the year 2002 present a coverage of prenatal control of 71.4% with a concentration of three visits per pregnant woman. Coverage for postnatal care was 40.5%, family planning coverage was 30% with a preference for injectables (Depo-Provera). The ENDESA 2001 presents a coverage for modern family planning methods of 52% and the knowledge of women regarding HIV/AIDS as 81% of them having heard about the subject and 42.6% knowing two or three forms to avoid the disease.

**Table 2: Department of Jinotega Demographics**

[1] PROGRAMA DE INTERVENCION MODULAR. Annual Operational Plan 2001-2003, SILAIS Jinotega, MINSA.

| Municipalities | Population 2003 | % | Km² | Density |
|---|---|---|---|---|
| Jinotega | 57,881 | 23.5 | 1,239 | 46.7 |
| La Concordia | 9,421 | 3.8 | 224 | 42.1 |
| San Rafael del Norte | 16,969 | 6.9 | 468 | 36.3 |
| San Sebastian de Yali | 23,335 | 9.5 | 595 | 39.2 |
| Pantasma | 37,427 | 15.2 | 546 | 68.5 |
| Wiwili | 34,034 | 13.8 | 2,444 | 13.9 |
| El Cua | 38,384 | 15.6 | 3,872 | 9.9 |
| San Jose de Bocay | 28,686 | 11.7 | N/A | N/A |
| Total | 246,137 | 100.0 | 9,388 | 26.2 |

The municipalities with the largest geographical extension Wiwili, El Cua and Bocay, represent 41% of the total population with a very scattered population contributing to the health problems and promoting reduced coverage most noticeable in the minority indigenous communities, Miskitos, Sumos, compounded by the difficulty of access due to geographical and cultural barriers.

**Table 3: SILAIS Jinotega Health Facilities by Type**

| Municipalities | Hospitals | H/Cs | H/Ps "A" | H/Ps "B" | Total |
|---|---|---|---|---|---|
| Jinotega | 1 | 1 | 4 | 9 | 15 |
| La Concordia | | 1 | 1 | 2 | 4 |
| San Rafael del Norte | | 1 | 1 | 2 | 4 |
| San Sebastian de Yali | | 1 | 1 | 3 | 5 |
| Pantasma | | 1 | 2 | 4 | 7 |
| Wiwili | | 1 | 5 | 2 | 8 |
| El Cua | | 1 | 3 | 5 | 8 |
| San Jose de Bocay | | 1 | 3 | 1 | 5 |
| Total | 1 | 8 | 20 | 28 | 57 |

SILAIS health units are of four types: hospitals (secondary level), health centers, and health posts type "A" (health unit with doctor and nursing personnel) and health posts type "B" (health unit only with nursing personnel), primary level.

The SILAIS' services coverage for 2002 was estimated at 1.9 primary health units per 10,000 inhabitants, being this one of the main problems related to accessibility. The national average is estimated at 2.5 per 10,000 inhabitants.

Regarding the human resources of the SILAIS there are 4.0 doctors per 10,000 inhabitants, much lower than the national average of 7.4. It is worth noting that out of the total number of doctors in the SILAIS (121), 42% work in the secondary care level.
There are 1.2 nurses per 10,000 inhabitants as compared to the national average of 2.9. Of the total number of nurses 84% are auxiliary nurses and only 16% are registered nurses.

Project HOPE Nicaragua fulfills the mission of Project HOPE around the world in several ways, the target population are families in disadvantageous economical situation and therefore at greater risk regarding health issues. Project HOPE works in close cooperation with a community, promoting sustainable methodologies and strategies. In Nicaragua Project HOPE works under a cooperation agreement with the Ministry of Health. Starting with a program to provide medical supplies and equipment for five hospitals throughout the country between 1990 and 1992, Project HOPE has successfully implemented five projects

with the aim of reducing maternal and infant mortality and to improve equality of primary health care delivery by working closely with regional health counterparts and communities.

Project HOPE has been present in the department of Jinotega since 1999, first with a program to improve the equality of care at the primary level, 1999-2000, in three municipalities affected by Hurricane Mitch: Wiwili, Pantasma and rural Jinotega, followed by an extension of the project for one year for two municipalities, Jinotega and Pantasma, for the implementation of a AIN/EON-C (Integrated Services to the Child/Obstetric and Neonatal Emergencies in the Community) project, funded by the NICASALUD network.

**Program's description (September 2002 - 2007)**

Project HOPE is implementing a five-year CS program aimed at improving the health status of children under five and women of reproductive age in the Department of Jinotega, Nicaragua—with a focus on its rural populations, including those working on the region's many private coffee plantations. The program will build upon HOPE's strong network of public health education programs in Boaco, Chontales, and three municipalities of Jinotega. It will also benefit from lessons learned in HOPE's innovative and highly successful child survival program on the coffee plantations of Guatemala's Boca Costa region.

The continuous work of Project HOPE in the departments of Boaco and Chontales provided operational models and tools, which will be useful when facing some of the main challenges found in Jinotega, and will serve as the basis for this project. In Boaco, with the support of the USAID Mission in Nicaragua, Project HOPE established municipal health communities, which have served to strengthen the planning, implementation, and surveillance capabilities of the health services. This project will be focused on improving the quality of services provided to the poorest population in the rural areas through the training of health providers and supervisors.

In Chontales, a community approach achieved strong coordination between health workers and local leaders, community feeding centers and volunteers, elements on which the decentralization process is based. Being able to achieve this has provided Project HOPE with the technical criteria for its replication. It is worth noting here the success of the mother's reminder materials used in Chontales and Jinotega coordinated by Project HOPE, including the gathering of anthropometrical and biochemical data that comprise the main tools used by USAID and other donors, PVOs, NGOs and the government.

As a member of the NICASALUD network, Project HOPE coordinates activities in Jinotega with Project Concern International (PCI), Partners of the Americas-Wisconsin, Compañeros de las Americas, and Catholic Relief Services (CRS). Currently, Project HOPE is implementing an AIN/EON-C project with the support of NICASALUD until December 2003. Others local coordination included work with PROSALUD, the UNPD, UNFPA, PROFAMILIA and the European Union Project PRASNIC (Water and Sanitation for the Municipalities of Wiwili and Pantasma).

The target population includes 60,031 children under five and 70,827 women of reproductive age (130,858 total beneficiaries). The goal of this program is to reduce morbidity and mortality rates of children under five and women of reproductive age in the department of Jinotega's primarily rural communities. This will be achieved by building the service-delivery capacity of local health facilities and organizations; increasing the skills and elevating the morale of health care providers; strengthening cooperation among public, private and community stakeholders; and empowering consumers, particularly women, to take greater responsibility for personal and family health maintenance decisions.

The original proposal considered specific interventions and level of effort include immunization (5%), nutrition/micronutrient deficiencies (15%), breastfeeding promotion (10%), control of diarrheal disease (15%), pneumonia case management (10%), control of malaria (10%), maternal and neonatal care (20%), child spacing (10%), and STIs-HIV/AIDS (5%). The proposed interventions, with the exception of malaria, will be implemented in accordance with Nicaragua's AIN approach.

The program includes a specific set of capacity-building activities and objectives as well as health-related interventions. With respect to capacity building, HOPE will facilitate the establishment of Department- and Municipality-level Health Councils—to include representatives of SILAIS, municipalities, private coffee plantations and associations, PVOs, NGOs, community leaders, health providers, and international donors—to guide and extend the project.

The following table shows the main objectives by intervention according to the proposal:

**Table 4: Program Main Objectives by Intervention**

| |
|---|
| **NUTRITION / MICRONUTRIENTS** |
| To improve the nutritional status of children under 5 years of age |
| **BREASTFEEDING PROMOTION** |
| To improve breastfeeding practices of children aged 0-23 months old |
| **DIARRHEA** |
| To improve the quality of health care for children with diarrhea |
| **PNEUMONIA CASE MANAGEMENT** |
| To improve the quality of care for children with pneumonia |
| **INMUNIZATIONS** |
| To improve the immunization coverage of children under 2 years of age |
| **STIs-HIV/AIDS** |
| To increase the capacity of providers to provide health education, counseling, and referrals to women and their partners relating to sexual and reproductive health |
| **MATERNAL AND NEWBORN CARE** |
| To improve the quality of maternal and neonatal care services provided in health units |
| **CHILD SPACING** |
| To improve birth intervals in mothers with children aged 0-23 months old |

**The main focus for sustainability will be:**

- to increase the access of children under 5 years of age to quality health services
- to organize and/or strengthen municipal development committees to include health activities
- to ensure that coffee plantation health providers comply with MOH norms and protocols

**NOTE:** Regarding Malaria, this intervention was not included due to the following:

- The areas of greatest incidence of Malaria in Jinotega are located in geographical areas where this project will not have activities, five communities of the municipalities of Wiwili and Bocay located over the Coco and Bocay Rivers and accessible only by water.

- Malaria and dengue represent a large proportion of the SILAIS operational plan and as such, it should be budgeted at the same level as other anti-epidemic activities as the national center level. For this reason, it is probably better for Project HOPE to exclude it from its plan and if necessary to assign a priority to this intervention, the activities should be limited to the diagnose and treatment of fever as part of the clinical IMCI strategy for children.

The proposed interventions should satisfy the requirements for the achievement of the proposed objectives, and even though each intervention has been allocated a level of effort, it will be necessary to assign priorities by supervision areas in order to provide complete coverage to the project area.

## II. PROCESS AND PARTNERSHIP BUILDING

### A. Methods of identifying and engaging local partners/stakeholders in the KPC

Local partners/stakeholders participating in the KPC include MINSA (a both the central and Departmental (SILAIS) levels); national level USAID-supported programs, including NicaSalud (NGONetworks in Nicaragua) and MOST (USAID's Micronutrient Program); local PVOs/NGOs, including the American Red Cross, Caritas, Project Concern International (PCI), Wisconsin Partners in Health; and local volunteers (primarily brigadistas).

In order to carry out the training of personnel to take part of the survey an identification process of persons having prior experience with this type of service was carried out. Current HOPE Jinotega health educator's personnel came to our program from projects such as CARITAS, PCI and Wisconsin Partners in Health performing similar activities. Also, technical supervisors and managers of the project were selected from prior HOPE projects in Boaco, Chontales and Jinotega, having extensive experience both with KPC surveys and the proposed LQAS methodology. This made easier the training process facilitating understanding of the methodology and performance throughout the educational and survey processes.

### B. Specific roles of local partners/stakeholders in the KCP Survey

Project HOPE/ Jinotega coordinated the planning and the implementation of the baseline KPC survey. The following is a list of local partners and stakeholders involved in the implementation of the KPC and their specific roles.

*MINSA*—At the national level, MINSA provided two facilitators, Dr. Mayra Zapata and Mirna Zelaya, who participated in the training of interviewers in how to weigh children with the special Salter scales. At the SILAIS level, MINSA provided population (census) data and detailed local maps that were used to select communities and households, and loaned equipment, including HEMOCUE machines that were used to take hemoglobin measurements. The maps had been drawn in October 2002 by local "brigadistas" (community health promoters), and were very helpful in orienting the survey team and locating households once they arrived in a particular community.

*NicaSalud*—NicaSalud (NGONetworks in Nicaragua) is a network of Nicaraguan PVOs/NGOs and is the lead entities in Nicaragua that has pioneered the use of LQAS (Local Quality Assurance Supervision, formerly Lot Quality Assurance Sampling)—a sampling methodology that is used in surveys. LQAS requires relatively smaller sample sizes and allows comparisons among supervision areas, an attractive

feature for programs wanting to identify stronger and lesser performing areas to help them to determine where to concentrate resources. Dr. Fernando Campos of NicaSalud worked directly with the technical specialists of Project HOPE/ Jinotega to design the one-week training workshop, and participating in the workshop as a trainer. The curricula of the LQAS training workshop is found in Appendix A.

*MOST*—(USAID Micronutrient Program). -- The anthropometry and hemoglobin measurements was introduced for the first time in this type of survey. Therefore, HOPE requested the technical support of the micronutrient program MOST in Nicaragua. MOST staff provided the training on how to measure and weigh children under two years of age. It also covered techniques for blood taking and the use of the HEMOCUE to measure hemoglobin levels. The training included quality control, and support for the analysis of the data using Epi Info. Dr. Adelina Barrera and Dr. Margarita Perez provided the training in the field. MOST assumed the cost of their staff during the training and analysis.

*American Red Cross* (Cruz Roja Americana)—The ARC/Nicaragua was represented by Dr. Karla García, who participated for part the survey as a supervisor and observer to help ensure the quality of the data.

### C. Constraints in making the process more participatory

One of the key factors that limited the direct participation of more MINSA health staff as supervisors and interviewers in the survey was time. In addition to the one-week training course, data collection in the field was estimated to be 15 days, and most health staff are not able to leave their posts for such an extended period. Nevertheless, as noted above, SILAIS Jinotega provided support to the project as noted in the previous section, notably by allowing the project to borrow equipment (maps, HEMOCUES, etc.) and by making local "brigadistas" (community health promoters) available as guides.

### D. Participatory research used in the study

Project HOPE introduced the use of electronic Portable Digital Assistants (PDAs) to improve data collection practices and minimize data errors. The use of PDAs by the survey team was intended as a pilot program to find out the efficacy, easiness to use, and overall benefits for the analysis of data. The PDAs were purchased by HOPE in the US and taken to Nicaragua for their use by program staff during the KPC baseline survey. Project HOPE intends to use the PDAs throughout the life of the project for monitoring program activities.

## III. METHODS

### A. Questionnaires

Questionnaire development process

The sections and questions included in the baseline Project HOPE/ Jinotega KPC Survey are based on the model questions and modules contained in KPC 2000+ Questionnaire Manual (Spanish version). Project HOPE/ Jinotega staff is experienced in developing and implementing cross-sectional maternal and child health surveys: two surveys were recently conducted to evaluate projects ending in Boaco and Chontales. Project HOPE/ Nicaragua staff has also participated in numerous workshops and trainings on LQAS hosted by NicaSalud. NicaSalud, in collaboration with the PVOs, developed a local version of the KPC 2000+ Questionnaire.

The first draft of the survey questionnaire was developed in Spanish in Jinotega and sent to Project HOPE headquarters for review in early January 2003. Over the next several weeks, the survey instrument was refined by HOPE/ Jinotega and HOPE Headquarters staff, taking into account the suggested model

questions and indicator tabulation guides provided in the KPC 2000+ Questionnaire Manual, the reporting requirements of USAID/ Washington (Rapid Catch indicators), and additional items suggested by HOPE/ Jinotega staff, who work collaboratively with the Jinotega SILAIS (MINSA) staff and are aware of their priorities for data collection. Lastly, local terminology was used to tailor the data collection instruments for use in Jinotega, and the questionnaires were further refined following field-testing of the questionnaires just prior to the 'official' data collection.

After receiving input from experts at USAID, CAs (including Child Survival Technical Support (CSTS), and NGONetworks for Health), NicaSalud and Project HOPE Headquarters, it was decided that the project would use LQAS as the sampling methodology (versus the more traditional 30-cluster sampling developed by WHO). It was also decided to use parallel sampling, thus two questionnaires were developed, one for those mothers with infants 0-11 months, and the other for mothers with children 12-23 months. Parallel sampling is designed to target the most appropriate sub-target group with the most appropriate questions for that subgroup, allowing for a relatively fewer number of questions to be administered to any one subgroup. Another advantage is that recall bias may be reduced, as the question content will focus on behaviors or experiences relatively recent or current to a particular subgroup. For example, questions relating to antenatal and postpartum care are included in the questionnaire designed to administer to mothers with infants 0-11 months, while the question relating to completed immunizations by one year of age are asked of mothers who have children 12-23 months old. Parallel sampling may also provide higher quality data, as shorter interviews are less likely to trigger 'interview fatigue' compared to longer ones. Lastly, parallel sampling may produce more precise point estimates, because data from questionnaires with common questions can be pooled, allowing relatively larger sample sizes for particular items.

**Scope of survey, survey length, and versions of the questionnaire**

Modules included in the survey questionnaires correspond roughly to the proposed interventions included in the project proposal submitted to USAID/ Washington in December 2001. The two questionnaires included the following modules:

**Table 5: Number of Questions by Questionnaire**

| Module | Number of Questions* | |
|---|---|---|
| | 0-11 months | 12-23 months |
| Identification | 14 | 14 |
| Background | 5 | 5 |
| Nutrition and Breastfeeding | 7 | 7 |
| Growth and Monitoring | 8 | 8 |
| Immunization | - | 2 |
| Sick Child | 4 | 2 |
| Diarrheal Management | 9 | 9 |
| Acute Respiratory Infections | 9 | 9 |
| Prenatal Care | 7 | 4 |
| Intrapartum and Newborn Care | 5 | 2 |
| Family Planning | 5 | 7 |
| HIV/AIDS | 3 | 3 |
| Water and Sanitation | 2 | 2 |
| Communication | - | 4 |
| Anthropometry and Hemoglobin | 4 | 4 |
| Total | 82 | 82 |

*A few questions contain fields for more than one variable

The final versions of the questionnaires for both age groups can be found in Appendix B.

**Specially adapted survey questions**

Project HOPE worked together with the FANTA project to measure the complementary feeding practices of children under 2 in Jinotega. The study will be presented separately as it contains revised indicators for continued breastfeeding, frequency of feeding, dietary diversification, and an infant and child-feeding index for children 6-23 months.

**Adaptation**

Two questionnaires were designed adapting formats from the KPC 2000+, containing close, yes/no and multiple-choice questions. Questions were also designed to be simple and of easy comprehension. The questions were addressed to two types of informers: mothers with children 0 to 11 months of age and mothers with children 12 to 23 months old. The questionnaires were validated by means of a field test by technical and supervision personnel.

The following subjects were addressed in the survey:
General information, breastfeeding and infant nutrition, growth monitoring and development, mother's knowledge about general danger signs, immunization, diarrhea and pneumonia case management, mother's knowledge about danger signs for ARIs and diarrhea, prenatal care, delivery, immediate care to the newborn, family planning, HIV/AIDS knowledge and water and sanitation. Following the interview the anthropometrical measurements and hemoglobin for children and hemoglobin for mother were performed.

**B. KPC Indicators**

The following table lists the main indicators proposed for the program with the respective construction:

## Table 6: Indicators construction

| Indicator | Numerator | Denominator | Question Reference |
|---|---|---|---|
| 1. % of children aged 0-23 months weighed in the last 4 months according to growth monitoring card | Children aged 0-23 months weighed in the last 4 months according to growth monitoring card | Total children 0-23 months with growth monitoring card | CD2 |
| 2. % of children aged 0-23 months with low weight (weight for age) (<2Z) | Children aged 0-23 months with low weight (weight for age) (<2Z) | Total children 0-23 months in the study | AH1 / Pi 14 |
| 3. % of children aged 0-23 months stunted (height for age) (<2Z) | Children aged 0-23 months stunted (height for age) (<2Z) | Total children 0-23 months in the study | AH 2 / Pi 14 |
| 4. % of children aged 0-23 months with anemia | Children aged 0-23 months with hemoglobin less than 11mg/dl. | Total children 0-23 months in the study | AH 3 |
| 5. % of mothers of children aged 0-23 months who report having breastfed within the first hour after birth | Mothers of children aged 0-23 months who report having breastfed within the first hour after birth | Total mothers of children 0-23 months in the study | LN 2 |
| 6. % of mothers of children aged 0-23 months who report having breastfed within the first eight hours after birth | Mothers of children aged 0-23 months who report having breastfed within the first eight hours after birth | Total mothers of children 0-23 months in the study | LN 2 |
| 7. % of infants aged 0-5 months who received only breast milk in the past 24 hours | Infants aged 0-5 months who received breast milk only in the past 24 hours | Total infants 0-5 months in the study | LN6 A = 1<br>LN6 B-U = 0<br>Pi 14 < 6 |
| 8. % of mothers of children aged 0-23 months that know at least two signs of dehydration due to diarrhea | Mothers of children aged 0-23 months who can mention at least two of the following signs: sleepy, sunken eyes, folding skin, thirsty, restless or cranky. | Total mothers of children 0-23 months in the study | DM 9 = D |
| 9. % of mothers of children aged 0-23 months who report having sought assistance or counseling from a health unit or CORU during the child's last diarrheal episode | Mothers of children aged 0-23 months which had diarrhea in the last two weeks that report having sought assistance or counseling from a health unit or CORU | Total mothers of children 0-23 months in the study who had diarrhea in the last two weeks | DM7= A,B,C & F / DM1 = 1 |
| 10. % of mothers of children aged 0-23 months with a diarrheal episode in the last two weeks who report giving as much or more food to their child | Mothers of children aged 0-23 months with a diarrheal episode in the last two weeks who report giving as much or more food to their child during this episode | Total mothers of children 0-23 months in the study who had diarrhea in the last two weeks, excluding children 0-5 months with exclusive breastfeeding | DM5= 2 or 3 / DM1 = 1 – [(Pi 14 < 6) + (LN6 A = 1, LN6 B-U = 0)] |
| 11. % of mothers of children aged 0-23 months with a diarrheal episode in the last two weeks who report giving as much or more liquids or breast milk to their child | Mothers of children aged 0-23 months with a diarrheal episode in the last two weeks who report giving as much or more liquids or breast milk to their child during this episode | Total mothers of children 0-23 months in the study who had diarrhea in the last two weeks | DM4= 2 or 3 / DM1 = 1 |
| 12. % of children aged 0-23 months with cough and fast breathing in the last two weeks taken to a health unit | Mothers of children aged 0-23 months with cough and fast breathing in the last two weeks who report having taken the child to a health unit | Total mothers of children 0-23 months in the study with cough and fast breathing in the last two weeks | IR7= A or B or C / IR2 = 1 |
| 13. % of mothers of children aged 0-23 months who can identify fast breathing as a danger sign for | Mothers of children aged 0-23 months who can identify fast breathing as a danger sign for | Total mothers of children 0-23 months in the study | IR 9 = B |

| Indicator | Numerator | Denominator | Question Reference |
|---|---|---|---|
| pneumonia | pneumonia | | |
| 14. % of children aged 12-23 months with all recommended vaccines according to the growth monitoring card | Children aged 12-23 months with one dose of BCG, OPV3, 3Pentavalente and one MMR at the moment of their first birthday | Total children 12-23 months in the study | IN 2 = A - H |
| 15. % of mothers of children aged 0-23 months who know at least one way to prevent STIs-HIV/AIDS | Mothers of children aged 0-23 months who can mention at least one of the followings: abstinence, use of condom, having only one sex partner / being faithful | Total mothers of children 0-23 months in the study | VS 3 = B or C or D or E |
| 16. % of children aged 0-23 months who were born at least 24 months after the previous surviving child | Children aged 0-23 months born at least 24 months after the previous surviving child | Total children 0-23 months in the study | PF 3<br>(Child DOB 1 - Child DOB 2)<br>> 24 months |
| 17. % of mothers of children aged 12-23 months who desire no more children in the next two years, who are using some type of modern child spacing method | Mothers of children aged 12-23 months who are not pregnant, desire no more children or are not sure and report using one of the following modern child spacing methods: norplant, injectables, oral, IUD, condom / diaphragm, gel / foam, male or female surgical sterilization | Total mothers of children 12-23 months in the study, excluding pregnant women | PF 4 = 0 + PF 7 = 02 – 10<br>152 – PF 4 = 1 |
| 18. % of mothers of children aged 0-23 months who report having had at least one prenatal visit with a doctor or nurse | Mothers of children aged 0-23 months who report having had at least one prenatal visit with a doctor or nurse | Total mothers of children 12-23 months in the study | AP 1 = B |
| 19. % of mothers of children aged 0-23 months that report receiving on their arm the dT vaccine during the last pregnancy | Mothers of children aged 0-23 months that report receiving on their arm the dT vaccine during the last pregnancy | Total mothers of children 0-23 months in the study | AP 2 = 1 (12 to 23 m)<br>AP 3 = 1 (0 to 11 m) |
| 20. % of mothers of children aged 0-11 months who report having had at least one postpartum visit | Mothers of children aged 0-11 months, who report having had at least one postpartum visit | Total mothers of children 0-11 months in the study | PF 4 = 2 or 3 |
| 21. % of children aged 0-23 months whose birth was attended by a doctor or nurse | Children aged 0-23 months whose birth was attended by a doctor or nurse | Total children 0-23 months in the study | RN 2 = A or B |

## Table 7: Rapid CATCH Indicators

| Indicator | Numerator | Denominator | Question Reference |
|---|---|---|---|
| 1. % of children aged 0-23 months with low weight (weight for age) (<2Z) | Children aged 0-23 months with low weight (weight for age) (<2Z) | Total children 0-23 months in the study | AH1 / Pi 14 |
| 2. % of children aged 0-23 months who were born at least 24 months after the previous surviving child | Children aged 0-23 months born at least 24 months after the previous surviving child | Total children 0-23 months in the study | PF 3 (Child DOB 1 - Child DOB 2) > 24 months |
| 3. % of children aged 0-23 months whose birth was attended by a doctor or nurse | Children aged 0-23 months whose birth was attended by a doctor or nurse | Total children 0-23 months in the study | RN 2 = A or B |
| 4. % of mothers of children aged 0-23 months that received two doses of dT vaccine during the last pregnancy, according to health card | N/A | N/A | Not investigated |
| 5. % of infants aged 0-5 months who received breast milk only in the past 24 hours | Infants aged 0-5 months who received breast milk only in the past 24 hours | Total infants 0-5 months in the study | LN6 A = 1, LN6 B-U = 0 / Pi 14 < 6 |
| 6. % of children aged 6-9 months who received breast milk and complementary feeding in the past 24 hours | Mothers of children aged 6-9 months that report having given breast milk and complementary feeding in the past 24 hours | Total mothers of children 6-9 months in the study | LN 6 A = 1, LN 6 B to U = 1 (minimum 1), LN 7 > 0 |
| 7. % of children aged 12-23 months with all recommended vaccines at the moment of their first birthday according to the growth monitoring card | Children aged 12-23 months with one dose of BCG, OPV3, 3Pentavalente and one MMR at the moment of their first birthday | Total children 12-23 months in the study | IN 2 = A - H |
| 8. % of children aged 12-23 months that received the MMR vaccine according to the growth monitoring card | Children aged 12-23 months that received the MMR according to the growth monitoring card | Total children 12-23 months in the study | IN 2 = A - H |
| 9. % of children aged 0-23 months who slept under an impregnated mosquito net the previous night | N/A | N/A | Not investigated |
| 10. % of mothers of children aged 0-23 months that know at least two signs of childhood illnesses indicating the need for treatment | Mothers of children aged 0-23 months who can mention at least two of the following signs: looks tired, does not eat or drink, sleepy or hard to awake, has high fevers, has fast breathing, vomits all food or drinks, has seizures | Total mothers of children 0-23 months in the study | DM 9 = D |
| 11. % of children aged 0-23 months that received more liquids and continued feeding during an illness in the last two weeks | Mothers of children aged 0-23 months that had diarrhea or ARI in the last two weeks that report having given more liquids and continued feeding during an illness in the last two weeks | Total mothers of children 0-23 months with diarrhea or ARI in the last two weeks in the study | DM5= 2 or 3 / DM1 = 1 – [(Pi 14 < 6) + (LN6 A = 1, LN6 B-U = 0)] |
| 12. % of mothers of children aged 0-23 months who know at least one way to prevent STIs-HIV/AIDS | Mothers of children aged 0-23 months who can mention at least one of the followings: abstinence, use of condom, having only one sex partner / being faithful | Total mothers of children 0-23 months in the study | VS 3 = B or C or D or E |

| Indicator | Numerator | Denominator | Question Reference |
|---|---|---|---|
| 13. % of mothers of children aged 0-23 months who report washing their hands with water and soap before the preparation of meals, before feeding children, after defecation and after tending a child that has defecated | Mothers of children aged 0-23 months that mentioned the 4 situations when hands must be washed: before the preparation of meals, before feeding children, after defecation and after tending a child that has defecated | Total mothers of children 0-23 months in the study | AS1 = B, D , E & F |

## C. Sampling Design

**Universe:** 246,137 inhabitants of the Department of Jinotega
**Sampling size:** A random stratified sampling method, known as LQAS (Lot Quality Assurance Sampling), was used. Through LQAS, a sample size of 19 interviews per lot were obtained. Eight lots were identified, corresponding to each municipality in the Department of Jinotega. In addition, parallel sampling was used to better understand the knowledge, practices, and coverage of mothers with children 0-11 months, and mothers with children 12-23 months. Thus, slightly different questionnaires were used for each group (see Appendix B for the both instruments used). The sample sized used gave a total of 38 interviews per supervision area, or 152 interviews from each age group, or a grand total of 304 interviews for the total area of the project (Department of Jinotega).

LQAS is a simple sampling method, low-cost and fast that uses small sample sizes to determine the initial situation, coverage and quality of projects or interventions allowing the identification in a quick and precise manner of the project priorities within a supervision area and among several supervision areas. It also allows the determination of average coverage for the total project area. Data can be analyzed and used easily for immediate decision-making in supervision areas determined by the project.

For the purpose of the KPC baseline study, eight supervision areas were defined as follows:

- SA 1: Jinotega
- SA 2: San Rafael del Norte
- SA 3: La Concordia
- SA 4: San Sebastian de Yali
- SA 5: Santa Maria de Pantasma
- SA 6: Wiwili
- SA 7: El Cua
- SA 8: San Jose de Bocay

For the selection of the communities, a random sampling framework was used based on the population of communities within each supervision area. The result was the identification of communities to be sampled, which are listed in Appendix C. For each selected community the census and maps were updated, all of this in close coordination with MINSA personnel and CHVs.

According to the sampling framework, each one of the homes was numbered within the respective community map, selecting at random the homes to be interviewed. Following, also at random, if there was more than one informer or a mother had children both 0 to 11 and 12 to 23 months old, only one of them was selected for each home. In case that at the selected homes there were no informers to complete the sampling set, the nearest home was identified. No two interviews were ever made to the same mother, nor two interviews were carried out at the same home.

A sampling set was considered complete after having completed both interviews (0 to 11 and 12 to 23 months old). An interview was considered complete after filling out the questionnaire, weighting and measuring the child and taking the blood sample both from the mother and child. Only at this point a new home was selected to start the new sampling set. Following this procedure all sets identified for each community were completed until finishing the 19 corresponding set for each supervision area.

## D. Training

In preparation for the use of the LQAS methodology, technical and support personnel received training from NICASALUD, an organization with expertise in the use of LQAS methodology for baseline assessments in Nicaragua. Training was also provided to all personnel in anthropometrical measurements, blood sampling and hemoglobin determination, with the support of MOST-Nicaragua.

For the hemoglobin determinations, HEMOCUE[2] photometers were utilized, which used the principle that after erythrocytes are hemolyzed by sodium deoxycholate, hemoglobin is released. Hemoglobin is converted to methemoglobin by sodium nitrate, which together with sodium azide, give azidemethemoglobin. The absorbance is then measured at two wavelengths (570 and 880 nm) in order to compensate for turbidity in the sample. The sample is collected from arterial or venous blood and place on a microcuvette. For the sampling and survey, procedures and recommendations outlined in the HEMOCUE Operating Manual were followed.

For the measurement of weight on children, SALTER scales graduated in kilograms were used; and for height measurement locally manufactured measuring boards graduated in centimeters were used. Procedures outlined in the Manual for Determination of Nutritional Status[3] were followed. In order to achieve the standardized performance of the survey teams for all these procedures, field tests were conducted to assure quality of measure among survey personnel.

## E. Data Collection and Quality Control

The KPC data collection was conducted by the technical team from Project HOPE Jinotega and external personnel with experience in this type of surveys. The collection of data took place approximately within an intensive two-week fieldwork period. Project HOPE Jinotega used ten survey teams, which were composed by one supervisor and one interviewer in each team. Quality control was done by six staff members from Project HOPE and stakeholders who used a quality control checklist (see Appendix D) during the interview process. The Child Survival project manager, Dr. Mario Ortega was responsible for quality control with the technical assistance from the following persons: Virginia Lamprecht (Project HOPE Headquarters), Dr. Adelina Barrera (MOST), Dr. Karla Garcia (ARC), Karen Loaisiga and Dr. Edgar Rodriguez (Project HOPE Jinotega). The average time of the interview for anthropometrical measurements and hemoglobin determination was forty-five minutes. Even though the Department of Jinotega has multiethnic population, all interviews were conducted with a mestizo, Spanish-speaking population. By design from the conception of the proposal the minority populations speaking dialects and living alongside the rivers in the municipalities of Wiwili and Bocay were excluded from the survey.

In addition, this CS program pilot-tested the use of electronic Portable Digital Assistants (PDAs) for data capturing and analysis. Fifteen PDA units were purchased in the US and delivered to Jinotega in time for training and field-testing before the data collection. The model of PDA used was Dell Axim X5, which uses the Pocket PC environment. In addition, Project HOPE made use of the Pocket PC Creation software for the creation of the electronic version of the questionnaire in Pocket PC format, and for analysis. The PDA pilot test included only one questionnaire (for mothers with children 0-11 months of age). Project HOPE received technical support from the Child Survival Technical Support (CSTS) Project in the design of the electronic version of the questionnaire and in setting up the variables and logic framework to build key indicators automatically. All supervisors in the survey teams used a PDA to collect data in addition to the

[2] HemoCue, Blood Hemoglobin Photometer. Operating Manual. Bergstens, HBG H. US 2003

[3] COMO PESAR Y MEDIR NINOS. Procedures Manual for Measuring Nutritional Status, UN, Department of Technical Cooperation for Development and Office of Statistics. New York, 1988.

data gathered by the interviewer with paper and pencil. Project HOPE will submit a separate report with full details of the PDA pilot test in a separate report.

### Main survey problems in the field

Giving the survey process it was found that some women declined to be interviewed but an effort was made to collect basic information about them and possible reasons for their decision.

**Table 9: Respondents Rejection to the Survey by Municipality**

| Municipalities | No. | Age | Background | Child's Age | Reasons for denial |
|---|---|---|---|---|---|
| El Cua | 1 | 20 | Rural | 12-23 | The decision was not the mother's |
| | 2 | 17 | Rural | 0-11 | The decision was the husband's |
| | 3 | 16 | Urban | 0-11 | The decision was the husband's |
| | 4 | 30 | Rural | 12-23 | Refused the blood sampling |
| | 5 | 30 | Rural | 0-11 | Refused the weight-in and blood sampling |
| Wiwili | 6 | 23 | Rural | 0-11 | The decision was the husband's |
| | 7 | 45 | Rural | 0-11 | The decision was the husband's |
| | 8 | 24 | Rural | 12-23 | The decision was the husband's |
| | 9 | 20 | Urban | 12-23 | Refused the blood sampling |
| Pantasma | 10 | 20 | Urban | 0-11 | The decision was the husband's |
| | 11 | 30 | Urban | 0-11 | The decision was the husband's |
| San Rafael del Norte | 12 | 23 | Rural | 12-23 | Refused the blood sampling |
| | 13 | 27 | Rural | 12-23 | Refused the blood sampling |
| La Concordia | 14 | 21 | Rural | 0-11 | Baby was younger than 1 month of age |
| | 15 | 26 | Rural | 12-23 | Did not trust the interviewer |
| Jinotega | 16 | 33 | Rural | 0-11 | The decision was the husband's |
| | 17 | 27 | Rural | 0-11 | Refused the blood sampling |
| | 18 | 25 | Rural | 12-23 | The decision was the woman's mother' |
| | 19 | 23 | Rural | 12-23 | The decision was the woman's mother |
| | 20 | 32 | Rural | 12-23 | The decision was the husband's |

Analysis of the information provided by women that declined to be interviewed seems to indicate that the decision was not made by the women themselves, but rather by a family member (husband, mother in law or mother of the interviewed mother). Another important factor to underline is the fear regarding blood sampling. In spite of all these problems, the quality of the recollection was not affected, since another informer was sought at the nearest home.

## F. Data Analysis

Starting with the data collection process, manual tabulation of the results was also conducted. After all the information was collected data was entered into the EPI Info system, by the information systems specialist of Project HOPE Jinotega. Data analysis was made by comparing the specific results obtained for each supervision area with the average project coverage and with statistical data from the SILAIS and ENDESA 2001. The results of the survey are presented in LQAS summary tables in Section IV and discussed in Section V.

### Weighted population

It is important to remark that when information from different areas is collected, the specific estimates obtained for each area will not be exact, for this reason an estimation of coverage (with respective confidence intervals) must be calculated for the total project area with enough precision by combining all areas. This is accomplished by weighting the results of each supervision area according to the total population in the project area.

In other words, the weighted population is simply the proportion of the total programmed area population living within a specific lot or area. Furthermore, this weighted population can be used to calculate coverage for the total project area as well as confidence intervals.

Even though the weighted estimates are considered more precise than the non-weighted, the difference between this two is generally not big. In order to carry out the comparison of data between all supervision areas and the total project area the population was weighted for each one of the areas.

**Table 10: Total estimate sample with weighted population:**

| Supervision area | Sampling size (n) | Population (N) | Weighting ($w_i$) | |
|---|---|---|---|---|
| 1. Jinotega | 38 | 57,881 | 57,881 / 246,137 | **= 0.24** |
| 2. San Rafael del Norte | 38 | 16,969 | 16,969 / 246,137 | **= 0.07** |
| 3. La Concordia | 38 | 9,421 | 9,421 / 246,137 | **= 0.04** |
| 4. Yali | 38 | 23,335 | 23,335 / 246,137 | **= 0.09** |
| 5. Pantasma | 38 | 37,427 | 37,427 / 246,137 | **= 0.15** |
| 6. Wiwili | 38 | 34,034 | 34,034 / 246,137 | **= 0.14** |
| 7. El Cua | 38 | 38,384 | 38,384 / 246,137 | **= 0.16** |
| 8. Bocay | 38 | 28,686 | 28,686 / 246,137 | **= 0.12** |
| **Total project area** | **304** | **246,137** | | |

The following formulas were used to calculate adjusted (weighted) coverage rates for the entire region, and 95% Confidence Intervals (C.I.) for stratified random sampling using weighted coverage rates:

$$p_w = \sum wt_i * p_i$$

$$\text{C.I.} = \pm 1.96 * \sqrt{\sum \frac{wt_i^2 * p_i q_i}{n_i}}$$

where:

- $p_w$ = adjusted coverage rates for a region with multiple Supervision Areas
- C.I. = confidence interval for a coverage proportion for a region with multiple Supervision Areas
- 1.96 = Z score for the 95% confidence interval
- $wt_i$ = the weight for the *i*th Supervision Area described in Table 10
- $p_i$ = the coverage proportion for the *i*th Supervision Area
- $q_i$ = $1 - p_i$
- $n_i$ = the sample size from the *i*th Supervision Area

The formula for the C.I. was taken from Valadez, Joseph J. "*Assessing Child Survival Programs in Developing Countries*" Harvard School of Public Health. Boston. Massachusetts. p94. 1991.

See Appendix E for a complete list of all calculations by indicator, including average coverage rates, adjusted coverage rates (by population weigh), and confidence intervals calculations.

## Table 11: KPC Baseline results by indicator – Department of Jinotega, Nicaragua

| Indicator (for the entire project area) | Numerator | Denominator | Average Coverage Rates (%) | Adjusted Coverage Rates (%) | 95% C.I. (+ / -) |
|---|---|---|---|---|---|
| 1. % of children aged 0-23 months weighed in the last four months according to growth monitoring card. | 205 | 278 | 73.7 | 67.9 | 6.0 |
| 2. % of children aged 0-23 months with low weight (Weight-For-Age) (<2Z). | 20 | 304 | 6.6 | 7.6 | 3.5 |
| 3. % of children aged 0-23 months stunted (Height-For-Age) (<2Z). | 58 | 304 | 19.1 | 19.8 | 4.9 |
| 4. % of children aged 0-23 months with anemia (hemoglobin level < 11mg/dl). | 121 | 304 | 39.8 | 41.9 | 6.1 |
| 5. % of mothers of children aged 0-23 months who report having breastfed within the first hour after birth | 204 | 301 | 67.8 | 67.8 | 5.9 |
| 6. % of mothers of children aged 0-23 months who report having breastfed within the first 8 hours after birth. | 248 | 301 | 82.4 | 82.4 | 4.7 |
| 7. % of infants aged 0-5 months who received only breast milk in the past 24 hours. | 46 | 79 | 58.2 | 56.0 | 12.5 |
| 8. % of mothers of children aged 0-23 months that know at least two signs of dehydration due to diarrhea. | 86 | 304 | 28.3 | 26.9 | 5.5 |
| 9. % of mothers of children aged 0-23 months who report having sought assistance or counseling from a health unit or CORU during the child's last diarrheal episode. | 40 | 119 | 33.6 | 35.7 | 8.8 |
| 10. % of mothers of children aged 0-23 months with a diarrheal episode in the last two weeks who report giving as much or more food to their child. | 52 | 113 | 46.0 | 45.5 | 9.5 |
| 11. % of mothers with children aged 0-23 months with a diarrheal episode in the last two weeks who report giving as much or more liquids or breast milk to their child | 83 | 119 | 69.7 | 69.1 | 8.8 |
| 12. % of children aged 0-23 months with cough and fast breathing in the last two weeks taken to a health unit. | 58 | 96 | 60.4 | 59.7 | 10.6 |
| 13. % of mothers of children aged 0-23 months who can identify fast breathing as a danger sign for pneumonia. | 226 | 304 | 74.3 | 76.0 | 5.2 |
| 14. % of children aged 12-23 months with all recommended vaccines at the moment of their first birthday according to the growth monitoring card. | 107 | 152 | 70.4 | 68.7 | 8.2 |
| 15. % of mothers of children aged 0-23 months who know at least one way to prevent STIs-HIV/AIDS. | 134 | 304 | 44.1 | 43.3 | 6.0 |
| 16. % of children aged 0-23 months who were born at least 24 months after the previous surviving child. | 255 | 304 | 83.9 | 83.9 | 4.5 |
| 17. % of mothers of children aged 12-23 months who desire no more children in the next two years, who are using some type of modern child spacing method. | 86 | 138 | 62.3 | 65.3 | 8.7 |
| 18. % of mothers of children aged 0-23 months who report having had at least one prenatal visit with a doctor or nurse. | 271 | 304 | 89.1 | 89.0 | 3.8 |
| 19. % of mothers of children aged 0-23 months that report receiving on their arm the dT vaccine during the last pregnancy. | 260 | 304 | 85.5 | 85.4 | 4.2 |
| 20. % of mothers of children aged 0-11 months who report having had at least one postpartum visit. | 57 | 152 | 37.5 | 32.4 | 7.9 |
| 21. % of children aged 0-23 months whose birth was attended by a doctor or nurse. | 159 | 304 | 52.3 | 51.4 | 5.8 |

## Table 12: Rapid Catch Indicators

| Indicator (for the entire project area) | Numerator | Denominator | Average Coverage Rates (%) | Adjusted Coverage Rates (%) | 95% C.I. (+ / -) |
|---|---|---|---|---|---|
| 1. % of children aged 0-23 months with low weight (weight for age) (<2Z). | 20 | 304 | 6.6 | 7.6 | 3.5 |
| 2. % of children aged 0-23 months who were born at least 24 months after the previous surviving child. | 255 | 304 | 83.9 | 83.9 | 4.5 |
| 3. % of children aged 0-23 months whose birth was attended by a doctor or nurse. | 159 | 304 | 52.3 | 51.4 | 5.8 |
| 4. % of mothers of children aged 0-23 months that received two doses of the dT vaccine during the last pregnancy, according to health card. | | | | | |
| 5. % of infants aged 0-5 months who received breast milk only in the past 24 hours. | 46 | 79 | 58.2 | 56.4 | 12.5 |
| 6. % of children aged 6-9 months who received breast milk and complementary feeding in the past 24 hours. | 37 | 46 | 80.4 | 86.8 | 8.9 |
| 7. % of children aged 12-23 months with all recommended vaccines at the moment of their first birthday according to the growth monitoring card | 107 | 152 | 71.1 | 69.6 | 8.1 |
| 8. % of children aged 12-23 months that received the MMR vaccine according to the growth monitoring card | 108 | 152 | 71.1 | 69.6 | 8.1 |
| 9. % of children aged 0-23 months who slept under an impregnated mosquito net the previous night | | | | | |
| 10. % of mothers of children aged 0-23 months that know at least two signs of childhood illnesses indicating the need for treatment | 132 | 304 | 43.4 | 46.8 | 6.2 |
| 11. % of children aged 0-23 months that received more liquids and continued feeding during an illness in the last two weeks | 90 | 163 | 55.2 | 53.4 | 8.4 |
| 12. % of mothers of children aged 0-23 months who know at least two ways to prevent STIs-HIV/AIDS | 18 | 304 | 5.9 | 6.3 | 3.2 |
| 13. % of mothers of children aged 0-23 months who report washing their hands with water and soap before the preparation of meals, before feeding children, after defecation and after tending a child that has defecated | 58 | 304 | 19.1 | 19.2 | 4.9 |

## IV. Results

The following LQAS tables summarize the results found from the KPC baseline survey. Appendix F shows detailed LQAS tabulations carried out in the field to calculate the number of correct responses for each indicator by supervision area, along with decision rules and average coverage rates.

### Table 13: Breastfeeding

| Indicator | | Right answers by supervision area | | | | | | | | % | RD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| % of mothers of children aged 0-23 months who report having breastfed within the first 8 hours after birth. | 0-11 months | 18 | 17 | 17 | 15 | 18 | 17 | 14 | 14 | 86.1 | 15 |
| | 12-23 months | 14 | 15 | 18 | 17 | 16 | 16 | 10 | 12 | 78.7 | 13 |
| | Total | 32 | 32 | 35 | 32 | 34 | 33 | 24 | 26 | 82.4 | |
| | Weighted | 0.21 | 0.06 | 0.04 | 0.08 | 0.13 | 0.14 | 0.1 | 0.8 | **0.84** | |
| % of mothers of children aged 0-23 months who report having breastfed within the first hour after birth. | 0-11 months | 15 | 14 | 12 | 13 | 14 | 11 | 14 | 12 | 69.5 | 11 |
| | 12-23 months | 10 | 13 | 14 | 16 | 15 | 14 | 8 | 9 | 66.0 | 11 |
| | Total | 25 | 27 | 26 | 29 | 29 | 25 | 22 | 21 | 67.8 | |
| | Weighted | 0.16 | 0.05 | 0.03 | 0.07 | 0.11 | 0.09 | 0.1 | 0.07 | **0.68** | |
| % of infants aged 0-5 months who received only breast milk in the past 24 hours. | 0-11 months | 5 | 8 | 5 | 8 | 5 | 3 | 4 | 8 | 58.2 | |
| | Weighted | 0.13 | 0.06 | 0.02 | 0.07 | 0.08 | 0.05 | 0.09 | 0.06 | **0.56** | |

Source: Primary data, Baseline Study, Child Survival – 2003.

As shown on Table 1 breastfeeding practices of mothers with children 0 to 23 months of age, show an average of 67.4% of children receiving breast milk during the first hours after birth. The percentage for children receiving breastfeeding within eight hours after birth, MINSA norm, was 83%.

From the 0 to 11 months old sample, 79 children were younger than 6 months of age, out of which 56% had received exclusive breastfeeding within the last 24 hours.

### Table 14: Nutrition

| Indicator | | Right answers by supervision area | | | | | | | | % | RD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| % of children aged 0-23 months weighed in the last 4 months according to growth monitoring card. | 0-11 months | 11 | 19 | 18 | 18 | 16 | 6 | 14 | 10 | 83.0 | 14 |
| | 12-23 months | 9 | 16 | 17 | 17 | 14 | 5 | 10 | 5 | 65.0 | 10 |
| | Total | 20 | 35 | 35 | 35 | 30 | 11 | 24 | 15 | 73.7 | |
| | Weighted | 0.15 | 0.06 | 0.04 | 0.09 | 0.13 | 0.05 | 0.11 | 0.06 | **0.68** | |

Source: Primary data, Baseline Study, Child Survival – 2003.

The percentage of children weighted during the last 4 months and having information recorded in their health cards is 62%. This percentage is higher for the 0-11 months old group, with a 73.5%.

**Table 15: Malnutrition and anemia prevalence**

| Indicator | | Cases by supervision area | | | | | | | | % | DR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| % of children aged 0-23 months stunted (height for age) (<2Z). | 0-11 months | 1 | 2 | 1 | 0 | 1 | 2 | 2 | 3 | 7.9 | |
| | 12-23 months | 6 | 3 | 5 | 5 | 4 | 7 | 5 | 11 | 30.3 | |
| | Total | 7 | 5 | 6 | 5 | 5 | 9 | 7 | 14 | 19.1 | |
| | Weighted | 0.04 | 0.01 | 0.01 | 0.01 | 0.02 | 0.03 | 0.03 | 0.04 | **0.20** | |
| % of children aged 0-23 months with low weight (weight for age) (<2Z). | 0-11 months | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 2.0 | |
| | 12-23 months | 5 | 0 | 3 | 0 | 3 | 2 | 0 | 4 | 11.2 | |
| | Total | 5 | 0 | 4 | 0 | 3 | 2 | 2 | 4 | 6.6 | |
| | Weighted | 0.03 | 0 | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 | **0.08** | |
| % of children aged 0-23 months with anemia (< 11mgr/dl). | 0-11 months | 8 | 9 | 6 | 6 | 8 | 7 | 10 | 5 | 38.8 | |
| | 12-23 months | 8 | 4 | 6 | 9 | 13 | 5 | 7 | 10 | 40.8 | |
| | Total | 16 | 13 | 12 | 15 | 21 | 12 | 17 | 15 | 39.8 | |
| | Weighted | 0.1 | 0.02 | 0.01 | 0.04 | 0.08 | 0.04 | 0.07 | 0.05 | **0.42** | |
| % of mothers of children aged 0-23 months with anemia (< 12mgr/dl). Not including 15 pregnant mothers. | Mothers | 2 | 3 | 3 | 4 | 8 | 5 | 3 | 9 | 12.8 | |
| | Weighted | 0.01 | 0.01 | 0 | 0.01 | 0.04 | 0.02 | 0.02 | 0.03 | **0.14** | |

Source: Primary data, Baseline Study, Child Survival – 2003.

Prevalence of stunting (size/age) for children 0 to 23 months of age is 20%, observing a significant difference in the 12 to 23 months old group, for which a 30.03% is shown. Global malnutrition (weight/age) for children 0 to 23 months of age is 8%, with the 12 to 23 months old group showing the worst results. The prevalence of anemia for children 0 to 23 months of age is 42%, with similar results for both groups (0 to 11 and 12 to 23 months old), 39% (41% adjusted) and 41% (43% adjusted), respectively. The level for anemia found on mothers was 14%.

**Table 16: Immunization**

| Indicator | | Right answers by supervision area | | | | | | | | % | DR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| % of children aged 12-23 months with all recommended vaccines at the moment of their first birthday according to the growth monitoring card | 12-23 months | 13 | 13 | 16 | 17 | 10 | 12 | 14 | 12 | 70.4 | 12 |
| | Weighted | 0.16 | 0.05 | 0.03 | 0.08 | 0.08 | 0.09 | 0.12 | 0.08 | **0.69** | |

Source: Primary data, Baseline Study, Child Survival – 2003.

Complete immunization coverage for children 12 to 23 months of age found was 69%.

**Table 17: Diarrhea**

| Indicator | | Right answers by supervision area | | | | | | | | % | DR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| % of mothers of children aged 0-23 months that know at least two signs of dehydration due to diarrhea | 0-11 months | 2 | 7 | 8 | 6 | 2 | 7 | 5 | 3 | 26.3 | 3 |
| | 12-23 months | 9 | 6 | 7 | 6 | 7 | 4 | 3 | 4 | 30.3 | 4 |
| | Total | 11 | 13 | 15 | 12 | 9 | 11 | 8 | 7 | 28.3 | |
| | Weighted | 0.07 | 0.02 | 0.02 | 0.03 | 0.04 | 0.04 | 0.03 | 0.02 | **0.27** | |
| % of mothers of children aged 0-23 months who report having sought assistance or counseling from a health unit or CORU during the child's last diarrheal episode. | 0-11 months | 5 | 1 | 3 | 1 | 2 | 3 | 5 | 1 | 36.2 | |
| | 12-23 months | 5 | 1 | 6 | 2 | 0 | 3 | 0 | 2 | 31.1 | |
| | Total | 10 | 2 | 9 | 3 | 2 | 6 | 5 | 3 | 33.6 | |
| | Weighted | 0.15 | 0.01 | 0.03 | 0.03 | 0.02 | 0.05 | 0.04 | 0.02 | **0.35** | |
| % of mothers of children aged 0-23 months with a diarrheal episode in the last two weeks who report giving as much or more food to their child. | 0-11 months | 2 | 4 | 5 | 1 | 4 | 5 | 2 | 2 | 45.5 | |
| | 12-23 months | 5 | 0 | 3 | 2 | 5 | 4 | 1 | 7 | 46.6 | |
| | Total | 7 | 4 | 8 | 3 | 9 | 9 | 3 | 9 | 46.0 | |
| | Weighted | 0.11 | 0.03 | 0.02 | 0.03 | 0.1 | 0.08 | 0.03 | 0.06 | **0.46** | |
| % of mothers of children aged 0-23 months with a diarrheal episode in the last two weeks who report giving as much or more liquids or breast milk to their child. | 0-11 months | 5 | 4 | 5 | 1 | 7 | 6 | 5 | 5 | 65.5 | |
| | 12-23 months | 6 | 2 | 6 | 3 | 6 | 9 | 3 | 10 | 73.8 | |
| | Total | 11 | 6 | 11 | 4 | 13 | 15 | 8 | 15 | 69.7 | |
| | Weighted | 0.17 | 0.04 | 0.03 | 0.04 | 0.13 | 0.1 | 0.09 | 0.08 | **0.69** | |

Source: Primary data, Baseline Study, Child Survival – 2003.

Table 17 shows knowledge and practices of mothers regarding diarrhea diseases. From the total mothers surveyed (304) for both groups, 28% know the danger signs (dehydration signs).

A total of 119 diarrhea cases was found with a prevalence of 39.1% for the total project area, out of which 33.6% (40) received 0RS and 28.6% (34) did not receive any treatment. A total of 43 cases (48%) sought assistance or counseling from a health unit or CORU. Out of the 43 cases that sought assistance, 40 received it from a health unit and only 3 cases (2.5%) were assisted at a CORU.

Regarding the feeding practices of mothers during a diarrhea episode of their child it was found that 42% state having given more food and 69% report having given more liquids

**Table 18. Pneumonia case management:**

| Indicator | | Cases by supervision area | | | | | | | | % | DR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| % of children aged 0-23 months with cough and fast breathing in the last two weeks taken to a health unit. | 0-11 months | 3 | 5 | 1 | 4 | 5 | 3 | 5 | 4 | 62.5 | |
| | 12-23 months | 4 | 1 | 5 | 4 | 2 | 0 | 6 | 6 | 58.3 | |
| | Total | 7 | 6 | 6 | 8 | 7 | 3 | 11 | 10 | 60.4 | |
| | Weighted | 0.15 | 0.04 | 0.03 | 0.06 | 0.1 | 0.04 | 0.1 | 0.08 | **0.60** | |

Source: Primary data, Baseline Study, Child Survival – 2003.

The total number of mothers of children 0 to 23 months of age with fast breathing that sought assistance from a health unit was 60% for the total project area. This practice was found to be slightly better for the 0 to 11 months old group, 62.5%

**Table 19: Pneumonia danger signs knowledge:**

| Indicator | | Right answers by supervision area | | | | | | | | % | DR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| % of mothers of children aged 0-23 months who can identify fast breathing as a danger sign for pneumonia | 0-11 months | 16 | 14 | 15 | 13 | 15 | 12 | 16 | 15 | 76.3 | 13 |
| | 12-23 months | 16 | 13 | 14 | 18 | 14 | 10 | 14 | 11 | 72.4 | 12 |
| | Total | 32 | 27 | 29 | 31 | 29 | 22 | 30 | 26 | 74.3 | |
| | Weighted | 0.2 | 0.05 | 0.03 | 0.07 | 0.11 | 0.08 | 0.13 | 0.08 | **0.76** | |

Source: Primary data, Baseline Study, Child Survival – 2003.

Table 7 shows the results for mothers knowledge regarding danger signs for ARIs expressed as a percentage of the number of mothers that mention fast breathing as a pneumonia danger sign, 76%. The level of knowledge for both groups (0 to 11 and 12 to 23) was found to be similar.

**Table 20: Maternal and newborn care**

| Indicator | | Right answers by supervision area | | | | | | | | % | DR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| % of mothers of children aged 0-23 months who report having had at least one prenatal visit with a doctor or nurse. | 0-11 months | 18 | 19 | 19 | 19 | 16 | 17 | 16 | 13 | 90.1 | 16 |
| | 12-23 months | 18 | 19 | 18 | 18 | 17 | 15 | 17 | 12 | 88.2 | 15 |
| | Total | 36 | 38 | 37 | 37 | 33 | 32 | 33 | 25 | 89.1 | |
| | Weighted | 0.23 | 0.07 | 0.04 | 0.09 | 0.13 | 0.12 | 0.14 | 0.08 | **0.89** | |
| % of mothers of children aged 0-23 months that report receiving on their arm the dT vaccine during the last pregnancy. | 0-11 months | 18 | 19 | 19 | 18 | 16 | 14 | 16 | 12 | 86.8 | 15 |
| | 12-23 months | 18 | 18 | 18 | 17 | 16 | 13 | 16 | 12 | 84.2 | 14 |
| | Total | 36 | 37 | 37 | 35 | 32 | 27 | 32 | 24 | 85.5 | |
| | Weighted | 0.23 | 0.07 | 0.04 | 0.09 | 0.13 | 0.12 | 0.14 | 0.08 | **0.89** | |
| % of mothers of children aged 0-11 months who report having had at least one postpartum visit. | 0-11 months | 6 | 11 | 14 | 7 | 7 | 5 | 4 | 3 | 37.5 | 5 |
| | Weighted | 0.08 | 0.04 | 0.03 | 0.03 | 0.06 | 0.04 | 0.03 | 0.02 | **0.32** | |
| % of children aged 0-23 months whose birth was attended by a doctor or nurse. | 0-11 months | 12 | 13 | 16 | 9 | 11 | 4 | 12 | 3 | 52.6 | 8 |
| | 12-23 months | 13 | 12 | 14 | 12 | 10 | 5 | 11 | 2 | 52.0 | 8 |
| | Total | 25 | 25 | 30 | 21 | 21 | 9 | 23 | 5 | 52.3 | |
| | Weighted | 0.16 | 0.05 | 0.03 | 0.05 | 0.08 | 0.03 | 0.1 | 0.02 | **0.51** | |

Source: Primary data, Baseline Study, Child Survival – 2003.

The total number of mothers that referred having had at least one prenatal control was 89%, but only 34% were able to produce the health card with this information. Also, 89% of the mothers state having received the dT vaccine during their last pregnancy. The results are similar for mothers with children of both age groups (0 to 11 and 12 to 23 months old). The percentage of mothers with children 0 to 11 months old that referred having had a postnatal visit, was 32%. Institutional delivery coverage for both groups (0 to 11 and 12 to 23) was 51%.

**Table 21: Child spacing:**

| Indicator | | Right answers by supervision area | | | | | | | | % | DR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| % of children aged 0-23 months who were born at least 24 months after the previous surviving child. | 0-11 months | 18 | 17 | 19 | 15 | 17 | 14 | 16 | 16 | 86.8 | 15 |
| | 12-23 months | 16 | 16 | 18 | 18 | 15 | 14 | 16 | 10 | 80.9 | 14 |
| | Total | 34 | 33 | 37 | 33 | 32 | 28 | 32 | 26 | 83.9 | |
| | Weighted | 0.21 | 0.06 | 0.04 | 0.08 | 0.13 | 0.1 | 0.13 | 0.08 | **0.84** | |
| % of mothers of children aged 12-23 months who desire no more children in the next two years, who are using some type of modern child spacing method. | 12-23 months | 12 | 9 | 11 | 11 | 12 | 11 | 11 | 9 | 62.3 | 10 |
| | Weighted | 0.16 | 0.03 | 0.02 | 0.06 | 0.12 | 0.09 | 0.09 | 0.08 | **0.65** | |

Source: Primary data, Baseline Study, Child Survival – 2003.

The percentage of children 0 to 23 months old born at least 24 months after the previous surviving child was 84%. The percentage of mothers with children 12 to 23 months that prefer using a modern family planning method was 65%.

**Table 22: STIs-HIV/AIDS:**

| Indicator | | Right answers by supervision area | | | | | | | | % | RD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| % of mothers of children aged 0-23 months who know at least one way to prevent STIs-HIV/AIDS. | 0-11 months | 10 | 8 | 14 | 8 | 9 | 8 | 6 | 4 | 44.0 | 6 |
| | 12-23 months | 12 | 7 | 13 | 11 | 4 | 6 | 8 | 6 | 44.0 | 6 |
| | Total | 22 | 15 | 27 | 19 | 13 | 14 | 14 | 10 | 44.0 | |
| | Weighted | 0.14 | 0.03 | 0.03 | 0.05 | 0.05 | 0.05 | 0.06 | 0.03 | **0.43** | |

Source: Primary data, Baseline Study, Child Survival – 2003.

The percentage of mothers that report having heard about HIV/AIDS was 85%. From the mothers interviewed, 44.08% could mention at least one form to avoid getting HIV/AIDS. For this indicator the answers considered correct are: use of condom and having only one sex partner / being faithful. These possible answers are of programmatic significance for the SILAIS.

The percentage of mothers with children 0 to 23 months of age that referred knowing at least one form of preventing STIs/HIV/AIDS was 40%.

**Table 23: RAPID CATCH:**

| Indicator | | Right answers by supervision area | | | | | | | | % | DR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| % of mothers of children aged 0-23 months that know at least two signs of childhood illnesses indicating the need for treatment | 0-11 months | 9 | 7 | 6 | 6 | 6 | 10 | 10 | 8 | 40.8 | 6 |
| | 12-23 months | 9 | 6 | 7 | 6 | 13 | 10 | 12 | 7 | 46.1 | 7 |
| | Total | 18 | 13 | 13 | 12 | 19 | 20 | 22 | 15 | 43.4 | |
| | Weighted | 0.11 | 0.02 | 0.01 | 0.03 | 0.08 | 0.07 | 0.09 | 0.05 | **0.47** | |
| % of children aged 6-9 months who received breast milk and complementary feeding in the past 24 hours | 6-9 months | 5 | 4 | 5 | 3 | 5 | 6 | 6 | 3 | 80.4 | |
| | Weighted | 0.24 | 0.05 | 0.03 | 0.07 | 0.13 | 0.12 | 0.12 | 0.12 | **0.87** | |
| % of children aged 12-23 months that received the MMR vaccine according to the growth monitoring card. | 12-23 months | 13 | 13 | 16 | 17 | 11 | 13 | 14 | 11 | 71.1 | 12 |
| | Weighted | 0.16 | 0.05 | 0.03 | 0.08 | 0.09 | 0.1 | 0.12 | 0.07 | **0.70** | |
| % of children aged 0-23 months that received more liquids and continued feeding during an illness in the last two weeks (diarrhea or ARI). | 0-11 months | 3 | 6 | 5 | 5 | 5 | 6 | 7 | 9 | 55.4 | |
| | 12-23 months | 7 | 2 | 8 | 4 | 4 | 7 | 3 | 9 | 57.9 | |
| | Total | 10 | 8 | 13 | 9 | 9 | 13 | 10 | 18 | 56.6 | |
| | Weighted | 0.16 | 0.04 | 0.03 | 0.05 | 0.08 | 0.07 | 0.07 | 0.07 | **0.57** | |
| % of mothers of children aged 0-23 months who report washing their hands with water and soap before the preparation of meals, before feeding children, after defecation and after tending a child that has defecated | 0-11 months | 6 | 4 | 5 | 5 | 5 | 3 | 5 | 1 | 22.4 | 2 |
| | 12-23 months | 4 | 2 | 7 | 3 | 4 | 3 | 1 | 0 | 15.8 | 1 |
| | Total | 10 | 6 | 12 | 8 | 9 | 6 | 6 | 1 | 19.1 | |
| | Weighted | 0.06 | 0.01 | 0.01 | 0.02 | 0.04 | 0.02 | 0.03 | 0 | **0.19** | |

Source: Primary data, Baseline Study, Child Survival – 2003.

The percentage of mothers with children 0 to 23 months of age that referred knowing at least two childhood illnesses signs that indicate the need for immediate care and treatment was 47%. The percentage of children 12 to 23 months old that received the MMR vaccine was 70%. The percentage of children 6 to 9 months old that received breastfeeding and introduction to complementary feeding was 87%. Regarding water and sanitation the percentage of mothers with children 0 to 23 months of age that referred practicing hand washing with water and soap was 19% (before the preparation of meals, before feeding children, after defecation and after tending a child that has defecated).

See Appendix G for a detailed list of expenses incurred in Nicaragua for the implementation of the KPC baseline survey.

## V. DISCUSSION

### General characteristics

From the total number of mothers interviewed, 87.5% were from the rural area, 53.29% of the children were males and 46.71% females.

The baseline study found that 72.04% of women have attended school, 25.36% do not know how to read or write and 86.76% finished primary education. The age of mothers in the study ranged from 24 to 35 years old.

### BREASTFEEDING AND NUTRITION

1. Breastfeeding provides a significant nutritional value during the first years of life of the children it has significant influence on physical growth and mental and affective development. For these reasons Nicaragua promotes exclusive breastfeeding from the first hours after birth, besides providing breast milk to the child as many times as required, and continue this practice until two years of age. Even though breastfeeding is a natural process, successful breastfeeding requires a skill that needs to be learned both by the mother and child, and needing professional support during the pregnancy and delivery.

   The practice of breastfeeding in Jinotega is high, the same as in the rest of the country, with 99% of women having breastfed their children at some time. This natural practice facilitates the decision of mothers to provide exclusive breastfeeding and also to extend the practice up to the two years of age of the child. It was also found that 83% of the mothers start breastfeeding within the first eight hours after birth. This is an indicator of the national norm for breastfeeding. The practice of breastfeeding within the first hour shows a lower percentage of only 68%. This percentage is lower than the national average, which according to ENDESA 2001 is 76%.

   Comparing the results by supervision areas, it was found that areas 1, 7 and 8 are below the average coverage, identifying them as priority (See Table 1).

   It was also found that the practice for utilization of colostrum during the first three days after birth was adequate for all supervision areas, 95%. Regarding the persistence of breastfeeding it was found that 63% of children between 12 and 23 months of age were receiving breast milk. ENDESA 2001 highlights the Jinotega as one of the longest average duration for breastfeeding, more than 20 months.

   One of the priority indicators for the SILAIS Jinotega has been to promote the use of exclusive breastfeeding for all children younger than 6 months of age through the strategy of mother and child friendly health units since 1997, being able to certify all their primary health units over a three-year period. The results of the KPC show that 56% of mothers have given breast milk only to their children within the last 24 hours for the total project area. It was not possible to establish priorities within the supervision areas due to the fact that the sampling size was smaller than 19%.

   Considering the importance of identifying the average age for children younger than 6 months of age that receive exclusive breastfeeding, EPI Info was used obtaining 2.27 months as the average age. ENDESA 2001 indicates that 46.9% of children younger than 2 months of age receive exclusive breastfeeding; 33.6% receive exclusive breastfeeding for the 2 to 3 months old group and it goes as far

2. Nutrition

The indicators related to the GMP Program serve as a measure about the accessibility and practices of mothers with children 0 to 23 months of age for the monitoring of growth and development of their children. The SILAIS shows a coverage for the year 2002 of 70% for children younger than 5 years of age. According to the KPC survey in Jinotega, 92% of mothers have a health card for their children, out of which 69% had a record in their cards for weighting within the last four months previous to the survey. The mothers surveyed, reported that 51% of the children were weighted at the health unit and 16% during community weighting sessions. These results are encouraging considering that the initiative of weighting children in the communities is a new strategy being implemented only in a few communities of some supervisions areas, indicating the possibility to promote this practice for communities with difficult access to health units. The supervision areas found to be below the average coverage are: Jinotega, Wiwili and Bocay. This could be due to a combination of factors such as population size, geographical distribution and accessibility to services both institutional and community based.

In order to determine the nutritional status of children, two basic indicators were used:

- Percentage of children 0 to 23 months of age with low weight according to weight/age (<2SD). Through this indicator is possible to determine the percentage of children with global malnourishment problems.
- Percentage of children 0 to 23 months of age with stunting according to size/age (<2SD).

According to the indicator size/age, 20% (58) of the total number of children ages 0 to 23 months suffer from chronic malnutrition, with the 12 to 23 months old age group being the most affected, 30.3%. This seems to reinforce the conclusions that the farthest children are from breastfeeding and depend on complementary feeding, the most nutritional problems they present. When comparing supervision areas, the municipalities of Jinotega and Bocay appear as priorities (Table 3). ENDESA 2001 reports 36.7% chronic malnutrition in Jinotega for children 0 to 59 months of age. The apparent difference could be explained by the fact that the age range of children considered by ENDESA is larger, but it also seems to reaffirm the concept that as the child grows nutritional problems are greater, with nutritional practices and accessibility to quality food being the main factors.

Regarding global malnourishment according to weight/age it was found that 8% (20) of children show low weight, with the 12 to 23 months old age group being the most affected, 11.2% (17). The supervision areas with most problems are also Jinotega and Bocay, adding to these ones La Concordia (Table 3).

According to MINSA's norms, weight/age is used to evaluate the nutritional status of children younger than five years of age, with priority placed on early detection of acute malnourishment problems and risk, associated to nutritional practices and diseases.

In general, the prevalence of malnourishment is low as compared with values reported by ENDESA 2001, which showed that the percentage of global malnourishment (weight/age) was 19.4% and chronic malnourishment 36.7% (size/age) for children younger of five years of age. The difference again could be due to the age ranges considered.

3. Micronutrients

The MINSA has a policy to provide iron and Vitamin-A supplements starting at 6 months of age for all children younger than 5 years old, but the implementation of this norm has encountered problems due to lack of the supplements both at the local and national levels. The Nicaraguan government is also implementing a parallel strategy to fortify foods with micronutrients missing on the regular diet of populations at risk, which contributes to nutritional deficit. Salt is fortified with iodine, flour with iron and

folic acid, and sugar with Vitamin-A. From the KPC results processed through EPI Info it was found that 80% of children from 6 to 23 months of age had records of Vitamin-A supplementation on their health cards during the last six months and 37.7% had registered iron supplementation during the same period. It was not possible to identify specific supervision areas with the greatest needs.

In order to evaluate anemia problems, blood samples were taken from all children 0 to 23 months old and their mothers. The MINSA norm was used as the standard for determination of anemia; less than 11gr/dl for children 0 to 23 months of age, and less than 12gr/dl for non-pregnant women.

The results of the survey showed that children 0 to 23 months of age suffered from anemia, without finding significant differences between both age groups (0 to 11 and 12 to 23). The supervision areas that present the greatest prevalence of anemia are: Pantasma, El Cua, Jinotega and Bocay. Regarding anemia prevalence for non-pregnant women it was found an average of 13% for the total project area, with Bocay and Pantasma showing the lowest percentages.

No corrections in due to geographical elevations were necessary for non-pregnant women, since differences in altitudes are minimum and do not have significant influence on the prevalence of anemia.

According to the Second National Micronutrients Survey, carried out in 2000, 34% of children 6 to 59 months old presented anemia. There is no specific data for children 0 to 23 months of age.

4. Immunizations

The goal of the Extended Program for Immunization is to vaccinate 100% of the children with all vaccines in the vaccinations schedule by one year of age, according to national norms. The complete vaccinations schedule includes one dose of BCG at birth, three doses of OPV (Anti-Polio), three doses of "Pentavalente," and one dose of MMR.

The KPC results show immunization coverage of 69% for children 12 to 23 months of age or the total of project area. The supervision area of Pantasma did not reach the average coverage and the supervision areas of Wiwili and Bocay barely reached the limit (Table 4). These three areas have been identified as priority for this intervention and discussed with local health authorities who agreed with this set of priorities during the consultation process.

The results of the study show a similar coverage to the one reported by ENDESA 2001 both at the national level (71.6%) as well as for the department (70.5%). The KPC study was not able to determine the appropriate vaccination age, which is an important quality indicator for the program.

5. Diarrhea

The prevalence of diarrheal diseases for children 0 to 23 months of age found for the total project area was 39.1%. This is considered to be high, as compared to the national average used by the SILAIS. This high prevalence could be the result of the limited knowledge of mothers regarding the need to wash their hands (18%). According to ENDESA 2001 the prevalence was 19.6% of the age group of children 6 to 23 months old. During the year 2000 the SILAIS Jinotega registered a total of 15,115 diarrhea cases and 16,978 were reported in 2001.

The percentage of mothers of children with diarrhea within the last two weeks that sought assistance or counseling from health units or CORU was 35%. The greatest problem associated with diarrhea is dehydration. Loss of electrolytes in the liquid bowel movements increased the risk of dehydration, which is commonly treated by the use of ORS. Of the total numbers of mothers with children that had diarrhea

surveyed, 33.5% reported having given treatment to the children with Oral Therapy Rehydration (OTR). This practice is similar to the one reported by ENDESA 2001 which indicates a 39%.

Regarding the knowledge of mothers about danger signs of dehydration, a very limited knowledge was found. The results of the study showed that only 27% of mothers can mention two or more dehydration signs. This problem is observed as having a similar distribution throughout the 8 expedition areas. Regarding the practices of mothers when caring for children with diarrhea, it was found that 68% gave equal or more amount of liquids or breast milk, 42% gave equal or more amount of food. Due to the sample size (less than 19) it was not possible to determine priority supervision areas, but through the consultation process the municipalities of San Rafael and La Concordia were identified as having the greatest needs.

The information regarding practices is similar to the one reported by ENDESA 2001 for Jinotega, in which 32% of the mothers indicated giving the same amount of liquids to their children during the last diarrheal episode. At the national level 34.5% of mothers gave the same amount of food and 9.2% provided more solid foods.

The high prevalence of diarrhea and poor level of knowledge were the main consideration, which place these as a second priority by all municipalities (supervision areas) during the consultation process. Considering that diarrhea is a problem with multiple causes it is not possible to deal with all factors only through health interventions. For this it is necessary and integral approach including water and sanitation, health education (IEC) and change to traditional practices.

6. Pneumonia

One of the main health problems at the national level and in Jinotega is the high morbidity from ARIs and mortality by pneumonia. ENDESA 2001 reports that the highest prevalence for ARIs and pneumonia (36% to 37%) are found in children of the 6 to 11 months old group.

The results of the KPC study show prevalence for ARIs for 58.9% (179 cases) out of which 53.6% show fast breathing. Also, according to ENDESA 2001, Jinotega is above the national average of 35%.

The practice of seeking medical care from health units was found at 64% for mothers with children that showed fast breathing within the last two weeks. This result was similar for both age groups (0 to 11 and 12 to 23 months old) and all supervision areas. The percentage of mothers that can mention fast breathing as a pneumonia sign was 76%. The areas of Wiwili and Bocay did not reach the average coverage for the total project area. According to data from EPI Info, 8.5% of mothers identified intercostals retraction as sign of pneumonia throughout the project area. The use of antibiotics is estimated at 39% for both age groups (0 to 11 and 12 to 23).

During the consultation process with the municipalities this intervention was placed as the third priority due to its importance as a cost of infant mortality, together with diarrhea.

7. Maternal and newborn care

Regarding prenatal care, the following aspects were investigated: the person that provided the prenatal control, number of checkups, tetanus vaccine application, postpartum visits and delivery by medical personnel.

As observed from the baseline study results, the average coverage for prenatal visits for women that had at least one checkup performed by a doctor or nurse in a health unit was 89%. ENDESA 2001 reports

69.9%, which compared to the baseline study seems to indicate a positive trend for mothers to visit health units and receive prenatal care from medical personnel. One important result of the study is that area 8 (Bocay) was found significantly lower than the average, identifying it as a priority area.

Regarding to institutional births, 51% of deliveries were attended by medical personnel. ENDESA 2001 report that women that were cared for by medical personnel during delivery was only 35%. A significant difference is found between ENDESA and the baseline study, probably because of the fact that five communities over the Coco and Bocay Rivers were not included in the study, which have the greatest difficulties regarding accessibility to health units. The supervision areas found noticeably below the average were 6 and 8 (Wiwili and Bocay).

With respect to the percentage of women that report having received one dose of dT vaccine on their arm the result was 85.5%. ENDESA 2001 reports that 83.1% of women received at least one dT vaccine and 44.7% could verify this through their health cards. Also, according to ENDESA, these results are not satisfactory the indicators have not changed since 1998. This situation is probably due to several reasons, including delayed early care for pregnant women through prenatal checkups and external factors associated with accessibility to the health units.
The areas showing the lowest vaccination coverage for the complete schedule are San Rafael del Norte, La Concordia and Bocay.

The reason to investigate if the mothers had received the dT vaccine during their last pregnancy from the mothers answers and not from their health cards was that in most cases mothers do not keep their prenatal cards, being this the only way to verify the actual vaccination. After tabulating the information about mothers that keep their prenatal cards it was found that only 143 mothers (47%) out of the 304 could produce the card.

Regarding the percentage of mothers with children 0 to 11 months that report having had at least one postnatal visit, the result was 38.8%. The 12 to 23 months old group was not investigated. According to ENDESA 2001, 22.6% of mothers in Jinotega reported having at least one postnatal checkup. This indicator is one of the priorities for the SILAIS, reinforced by the baseline study results, which show that all areas are below the average coverage.

With respect to child spacing two aspects were investigated, the first one regarding child spacing of at least 24 months, and the second with the use of modern family planning methods (Table 9).

The result for children that were born at least 24 months after the previous surviving child was 84%. The percentage reported by ENDESA 2001 was 69.4%. The baseline study results seem to indicate a slight increase in child spacing during the past two years. There are significant differences between supervision areas, with the coverage for areas 6 and 8 (Wiwili and Bocay) found way below the average coverage (Table 9).

Regarding the use of modern family planning methods for mothers with children 12 to 23 months of age, the KPC study shows a 65% result. According to ENDESA 2001 the average was 52% for Jinotega. The areas found the average coverage are 2 and 8 (San Rafael and Bocay).

Regarding Malaria this one was not included in the study since the highest prevalence is in areas in which the project will have no activities, or work directly.

8. HIV/AIDS

The percentage of mothers with children aged 0 to 23 months that report having heard about HIV/AIDS was 85%. From the total number of mothers interviewed, 44.08% could mention at least one form to avoid getting HIV/AIDS. For this indicator the answers considered correct are: use of condom and having only one sex partner / being faithful. Of these same mothers only 6% could mention both forms of prevention against HIV/AIDS. The knowledge of these forms to protect themselves against HIV/AIDS is of programmatic significance for the SILAIS.

In general, the total project area is below the results reported by ENDESA 2001, which indicate that 67.7% of women know at least one form of prevention. The reason for this could be that in Jinotega HIV/AIDS is not considered a health problem, and as such it is not a priority.

During the consultation process with the municipalities, both health personnel and partners listed this intervention as the lowest priority. The supervision areas that did not reach the average coverage are Bocay, San Rafael del Norte and Pantasma.

9. Water and sanitation

Only 19% of the mothers interviewed can mention 4 situations in which hands must be washed with water and soap. The answers were considered correct only when the mother mentioned the following: before preparation of meals, before feeding children, after defecation and after having tended to a child that had defecated. ENDESA 2001 does not report results for Jinotega regarding hand washing.

The results of the KPC study show that 62% of the interviewed mothers report using a latrine for defecation and urination. This result is only slightly different from the 53.4% reported by ENDESA 2001. The SILAIS Jinotega has no data regarding this subject.

10. Communications

The percentage of mothers that report having radio in their home was 69.7%. Information related to health messages heard through the radio is scarce probably due to the existence of a number of radio stations in each municipality. The most popular radio stations do not transmit health messages.

11. Consultation process

Following the conclusion of the KPC survey a consultation process took place by the municipalities, through which the preliminary results of the manual tabulated information were presented. This information served as the basis for a priority identification exercise, which yielded the main interventions per supervision area. This process was done in cooperation with the municipal health authorities, and other attending partners such as mayor's office, MECD, PCI, the Church, and Cuculmeca, among others.

The main criteria considered for identification of priorities were problem size, importance, vulnerability and cost, using the following definitions and ranking quantitative values:

*Problem size:*

This factor represents a value of the percentage weight of a health problem considering morbidity and mortality among the target population.

Scores: 1 = very low, 2 = low, 3 = average, 4 = high and 5 = very high.

*Importance*

This is a measure of the social and economical significance of the health problem.

Scores: 1 = very low, 2 = low, 3 = average, 4 = high and 5 = very high.

*Vulnerability*

Indicating the availability of lack of adequate technology for preventing or therapeutical activities, sufficient to confront the health problem.

Scores: 1 = very low, 2 = low, 3 = average, 4 = high and 5 = very high.

*Cost*

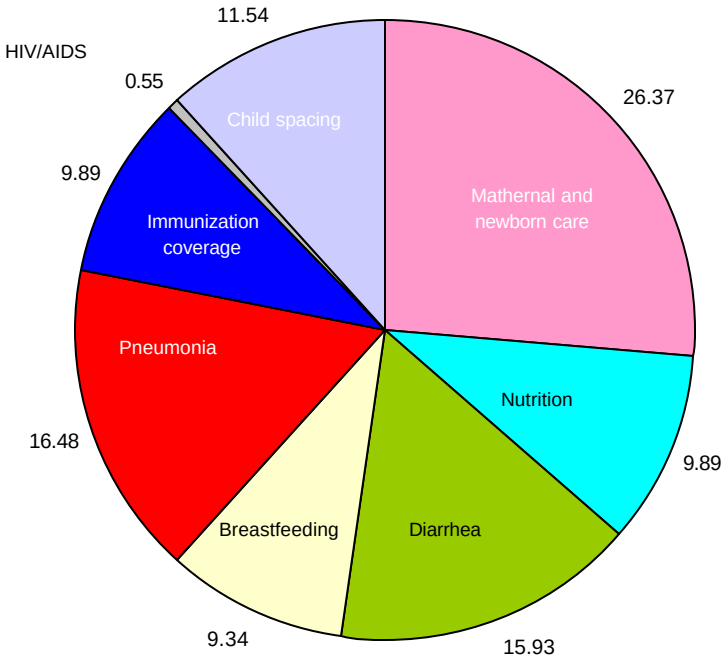
Defined as the amount of resources: human, material, technological and financial that must be invested for the solution of the health problem.

Scores: 1 = very low, 2 = low, 3 = average, 4 = high and 5 = very high.

## Priorities by interventions

| INTERVENTIONS | PROBLEM STATEMENT | CRITERIA | | | | PRIORITY | | EFFORT LEVEL | |
|---|---|---|---|---|---|---|---|---|---|
| | | Problem size | Impor-tance | Vulne-rability | Cost | Score | Order | Total before | Total revised |
| MATERNAL AND NEWBORN CARE | - High maternal mortality rates<br>- Low coverage<br>- Poor quality | 5 | 5 | 3 | 3 | 16 | **1** | 20 | 30 |
| NUTRITION | - Poor quality and quantity feeding practices | 3 | 5 | 2 | 1 | 11 | **5** | 15 | 13 |
| DIARRHEA | - High prevalence<br>- High child mortality rates | 4 | 3 | 5 | 3 | 15 | **2** | 15 | 15 |
| BREASTFEEDING | - Low exclusive breastfeeding | 3 | 3 | 4 | 3 | 13 | **4** | 10 | 10 |
| PNEUMONIA | - High prevalence<br>- High child mortality rates | 4 | 4 | 3 | 3 | 14 | **3** | 10 | 10 |
| IMMUNIZATION | - Incomplete vaccination schedule<br>- Difficult access in areas 6 and 8 | 2 | 2 | 4 | 3 | 11 | **6** | 5 | 7 |
| HIV/AIDS | - Lack of accurate data | 1 | 2 | 4 | 1 | 8 | **8** | 5 | 5 |
| FAMILY PLANNING | - Low coverage associated with accessibility in some areas | 3 | 3 | 2 | 2 | 10 | **7** | 10 | 10 |
| TOTALS | | | | | | | | **90** | **100** |
| SUSTAINABILITY is used as a tracing indicator for all in interventions | | | | | | | | | |

**Priority Intervention for the Entire Program Area**



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